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PATENT

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In re application of

Trent J. Brundage

Application No.: 09/854,408

Filed: May 10, 2001

For: DIGITAL WATERMARKING  
APPARATUS, SYSTEMS AND  
METHODS

Examiner: T. Teslovich

Date: January 3, 2006

Response Under 37 CFR § 1.116  
Expedited Procedure

JAN 03 2006

Art Unit: 2137

Confirmation No.: 8219

CERTIFICATE OF TRANSMISSION

I hereby certify that this paper and the documents referred to as being attached or enclosed herewith are being facsimile transmitted to the United States Patent and Trademark Office at 571-273-8300 on January 3, 2006.

Steven W. Stewart  
Attorney for ApplicantsTRANSMITTAL LETTER

MAIL STOP APPEAL BRIEF – PATENTS  
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Alexandria, VA 22313-1450

44

Enclosed for filing in the above-captioned matter are the following:

- Appeal Brief (fee \$500.00)
- If an extension of time is required, please consider this a petition therefor.
- Please charge \$500.00 (fee for Appeal Brief) and any additional fees which may be required in connection with filing this document and any extension of time fee, or credit any overpayment, to Deposit Account No. 50-1071.

Date: January 3, 2006

CUSTOMER NUMBER 23735

Phone: 503-469-4800  
FAX 503-469-4777

Respectfully submitted,

DIGIMARC CORPORATION

By Steven W. Stewart  
Registration No. 45,133

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9405 SW Gemini Drive, Beaverton, OR 97008 USA  
T. +1 503.469.4800 F. +1 503.469.4777 www.digimarc.com

JAN 03 2006

**FACSIMILE TRANSMITTAL**

DATE: January 3, 2006

RE: U.S. Patent Application No. 09/854,408

TO: Commissioner of Patents

FILED: May 10, 2001

FAX: 571-273-8300

FOR: DIGITAL WATERMARKS USED IN  
AUTOMATION EQUIPMENT

FROM: Steven W. Stewart

ART UNIT: 2137

PAGES: 22 (including cover)

DOCKET NO.: EWG-144

Urgent       For Review       Please Reply

**FACSIMILE COVER LETTER**

Attached is an Appeal Brief and Transmittal Letter with deposit account authorization for the above referenced application.

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Steven W. Stewart, Reg. No. 45,133  
Attorney for Applicant

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JAN 03 2006

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

## Response Under 37 CFR § 1.116

Trent J. Brundage

## Expedited Procedure

Application No.: **09/854,408**

Art Unit: 2137

Filed: May 10, 2001

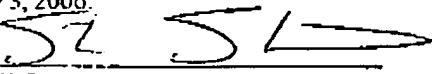
Confirmation No.: 8219

For: **DIGITAL WATERMARKING  
APPARATUS, SYSTEMS AND  
METHODS**CERTIFICATE OF TRANSMISSION

Examiner: T. Teslovich

I hereby certify that this paper and the documents referred to as being attached or enclosed herewith are being facsimile transmitted to the United States Patent and Trademark Office at 571-273-8300 on January 3, 2006.

Date: January 3, 2006

  
 Steven W. Stewart  
 Attorney for Applicants
APPEAL BRIEF

Mail Stop Appeal Brief – Patents  
 COMMISSIONER FOR PATENTS  
 P.O. Box 1450  
 Alexandria, VA 22313-1450

Sir:

Appellant respectfully requests the Board of Patent Appeals and Interferences (hereafter referred to as "the Board") to reverse the outstanding final rejection of the pending claims.

This Appeal Brief is in furtherance of a Notice of Appeal filed November 2, 2005 (postcard stamped received on November 4, 2005). Please charge the fee required under 37 CFR 1.17(f) or any needed fee to deposit account 50-1071.

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Appeal Brief – 09/854,408

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**REAL PARTY IN INTEREST**

The real party in interest is Digimarc Corporation, by an assignment from the inventor recorded at Reel 011839, Frames 0266-0267, on May 10, 2001.

**RELATED APPEALS AND INTERFERENCES**

There are no related appeals or interferences.

**STATUS OF CLAIMS**

Claims 1-28 are pending in the present application. Each of the pending claims stands finally rejected. *Please see* the Office Action Summary in the final Office Action mailed July 1, 2005, and the October 12, 2005 Advisory Action.

**STATUS OF AMENDMENTS**

All earlier-filed amendments have been entered.

**SUMMARY OF CLAIMED SUBJECT MATTER**

The present invention relates generally to automation equipment and in some cases to automation equipment that utilizes machine vision. *Please see, e.g.,* page 1, lines 4-5, of the specification. In some implementations an item or part includes steganographic (or hidden) markings. *Please see, e.g.,* page 2, lines 16-21. The markings include an orientation signal that is used to resolve the relative orientation of the item or part. *Please see, e.g.,* page 2, lines 16-21 and the paragraph spanning pages 3 and 4.

Accordingly, one implementation of the invention, as recited in claim 21, is a robot for handling items is provided. *Please see, e.g.,* page 3, lines 3-4 and page 6, lines 6-10. The robot includes: an image sensor for sensing image data of an item including a machine-readable code provided on a surface thereof (see, e.g., page 3, lines 8-14), wherein the machine-readable code comprises an orientation component (please see, e.g., page 2, lines 16-19; Figs. 4A-4C; page 4, lines 1-8; and the paragraph spanning pages 4 and 5); electronic processing circuitry (please see,

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e.g., page 3, lines 17-18; Fig. 2, CPU 102; and memory including instructions stored therein for execution by the electronic processing circuitry (please see, e.g., Fig. 2, including, e.g., CPU 102, memory 102A and/or programs 102B). The instructions include instructions to: analyze image data captured by the image sensor (please see, e.g., page 3, lines 25-26), determine from analyzed image data an orientation of the item relative to the orientation component (please see, e.g., page 3, line 26 – page 4, line 2; page 4, lines 3-8), and provide position information based on a determined orientation of the item (please see, e.g., page 4, lines 9-18; Figs. 4A-4C; see also the paragraph spanning pages 4 and 5; and page 5, lines 19-25). Please see also Fig. 5 and related description at page 6, lines 11 – page 7, line 7.

Another implementation of the invention, as recited in claim 12, is a robot for handling items. *Please see, e.g., page 3, lines 3-4 and page 6, lines 6-10.* The robot includes: a camera for acquiring an electronic image of a digital watermark (please see, e.g., page 3, lines 8-14 and Fig. 1, camera 108); a computer (please see, e.g., page 3, lines 15-18; and Fig. 1, computer 100) including a program for reading a digital watermark in an electronic image acquired by said camera (please see, e.g., page 3, line 10 and lines 25-26); and a controller for controlling said robot in response to orientation data acquired from said digital watermark (please see, e.g., page 3, lines 16-17), said controller controlling positioning or movement of an item including the digital watermark (please see, e.g., Fig. 5 and page 6, 11- page 7, line 7, including step 509; and page 5, lines 19-25).

Yet another implementation of the invention, as recited in claim 1, is a method for controlling placement of a first part on a second part. *Please see, e.g., page 3, lines 4-7.* The method includes: placing a printed image containing a digital watermark on at least one of said parts (please see, e.g., original claim 1; page 2, lines 9-12); capturing a digital image of said printed image (please see, e.g., original claim 1; page 3, lines 25-26; and page 6, lines 13-15); reading a grid signal contained in said digital watermark (please see, e.g., original claim 1; see also the paragraph spanning pages 3 and 4); and determining the angular rotation of said at least one of said parts from said grid signal (please see, e.g., original claim 1; see also the paragraph spanning pages 4 and 5; and see Figs. 4A-4C).

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Still another implementation of the invention, as recited in claim 17, is a method for controlling placement of a first part on a second part. Please see, e.g., page 3, lines 4-7. The first part includes steganographic encoding redundantly provided thereon. Please see, e.g., page 5, lines 15-18 and Fig. 3. The steganographic encoding includes an orientation component. Please see, e.g., page 2, lines 16-19; Figs. 4A-4C; page 4, lines 1-8; and the paragraph spanning pages 4 and 5. The method includes receiving image data corresponding to at least a portion of the first part (please see, e.g., page 3, lines 25-26; and page 6, lines 13-15), the portion including at least one redundant instance of the steganographic encoding (please see, e.g., page 3, lines 25-26; page 6, lines 13-15; and page 5, lines 18-18); reading the orientation component of the steganographic encoding (please see, e.g., page 3, lines 25-26 and page 6, lines 15-20); determining an orientation of the first part through reference to at least the orientation component of the steganographic encoding (please see, e.g., page 6, lines 23-26); controlling placement of the first part on the second part through reference to at least the determined orientation of the first part (please see, e.g., page 3, lines 4-7; page 5, lines 19-25; and page 7, lines 5-7).

Yet another implementation of the invention, as recited in claim 6, is a system for controlling a pick and placement machine which places a first part on a second part. Please see, e.g., page 3, lines 4-7. At least one of the parts includes a digital watermark. Please see, e.g., page 3, line 11; page 5, lines 15-18; and page 6, lines 11-13. The system includes means for reading data from said digital watermark from said part (please see, e.g., Fig. 1, camera 108 and computer 100 and page 3, lines 15-26), and means for determining the orientation of said at least one of said parts from the data read from said digital watermark (please see, e.g., Fig. 1, camera 108 and computer 100; see also page 4, lines 102; the paragraph spanning pages 4 and 5).

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**GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL**

1. Claims 12-16 and 21-26 stand finally rejected under 35 U.S.C. § 103 as being unpatentable over U.S. Patent No. 5,113,445 (hereafter referred to as "the Wang patent") in view of assignee's U.S. Patent No. 5,862,260 (hereafter referred to as "the Rhoads patent").
2. Claims 1-11, 17-20 and 27-28 stand finally rejected under 35 U.S.C. § 103 as being unpatentable over the Wang patent in view of the Rhoads patent and in further view of U.S. Patent No. 6,282,528 (hereafter referred to as "the Schaffer patent").

**ARGUMENT**

Appellant respectfully requests that the final rejection of the pending claims be reversed since the cited references fail to teach or suggest all of the elements of the pending claims.

***Rejections under 35 U.S.C. § 103 over the Wang Patent in view of the Rhoads Patent*****Claims 21-28**

Independent claim 21 recites the following:

21. A robot for handling items, said robot comprising:
  - an image sensor for sensing image data of an item including a machine-readable code provided on a surface thereof, wherein the machine-readable code comprises an orientation component;
  - electronic processing circuitry; and
  - memory including instructions stored therein for execution by the electronic processing circuitry, the instructions including instructions to:
    - analyze image data captured by the image sensor,
    - determine from analyzed image data an orientation of the item relative to the orientation component, and
    - provide position information based on a determined orientation of the item.

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The cited Wang passages seem concerned with data (e.g., binary data) encoded in a 2-D graphic such as a 2-D barcode. A decoding operation decodes a 2-D graphic and generates output signals to represent the data (Col. 2, lines 53-55). The data may include, e.g., a phone number or data entry instructions (Col. 6, lines 43-47). The invention seems directed at a system to represent data in machine-readable form to expand applications for automatic data entry (Col. 3, lines 27-31).

While Wang is concerned with carrying data, it seems silent with respect to orientation or position information associated with an encoded 2-D graphic.

Indeed, there is no mention of an orientation component in the 2-D graphic that is used to determine position information for an item carrying the 2-D graphic.

(The Wang patent provides an alternative data carrier – via magnetic ink (Col. 5, lines 7-13). Here, again, there is no discussion of a magnetic orientation component or how orientation information could be obtained via a magnetic ink pattern.)

Rhoads provides an excellent treatise on steganography and digital watermarking. And the cited<sup>1</sup> Col. 72 sections do describe some examples of an orientation component covered by claim 21.

But the cited Col. 95 section of the Rhoads patent – including a discussion of automobile and airline parts – is concerned with security or thwarting counterfeiting. Industrial parts are steganographically marked to provide an inconspicuous identification tag (Col. 95, lines 9-11).

There is no mention in the cited sections of the Rhodes patent of a robot to handle items and determining an orientation of an item (e.g., a part) and providing physical position information there from.

Thus, even if the cited sections are combined as suggested, the resulting combination would not yield applicant's claimed invention (claim 21), including determining an orientation of a marked item relative to an orientation component, and providing position information based on a determined orientation of the item, in combination with the other features of claim 21.

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<sup>1</sup> The July 1, 2005, Final Office Action cites the Rhoads patent at Col. 72 on page 7, lines 6-8.

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We also question the motivation statement on page 7, lines 14-15 of the July 1, 2005, Final Office Action. The Examiner suggests that that one of ordinary skill in the art would be motivated to combine the teaching in the Rhoads patent with the teachings in the Wang patent "to allow for an increase in the amount of data encoded onto the label".

We do not think that increasing data capacity of a label is a key motivation. Rather, a machine-readable code must include an orientation component as recited in claim 21.

We request that the final rejection with respect to claim 21 be reserved.

#### Claims 12-16

Independent claim 12 recites the following:

12. A robot for handling items, said robot including,  
a camera for acquiring an electronic image of a digital watermark,  
a computer including a program for reading a digital watermark in an electronic image  
acquired by said camera,  
a controller for controlling said robot in response to orientation data acquired from said  
digital watermark, said controller controlling positioning or movement of an item including the  
digital watermark.

Claim 12 recites a controller for controlling a robot in response to orientation data  
acquired from a digital watermark. The controller controls positioning or movement of an item  
including the digital watermark.

As discussed above, the Wang patent is silent regarding acquiring orientation data from a  
machine-readable code. Wang is also silent about controlling a position or movement of an item.

And, while the Rhoads patent is ground-breaking in the field of steganography and digital  
watermarking, the cited passages of the Rhoads patent do not discuss controlling a robot to  
position or move an item including a digital watermark in response to orientation data acquired  
from the digital watermark.

We respectfully request that the final rejection of claim 12 be reversed.

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*Rejections under 35 U.S.C. § 103 over the Wang Patent in view of the Rhoads Patent in further view of the Schaffer patent*

Claims 1-5

*Independent claim 1 reads as follows:*

1. A method for controlling placement of a first part on a second part comprising, placing a printed image containing a digital watermark on at least one of said parts, capturing a digital image of said printed image, reading a grid signal contained in said digital watermark, and determining the angular rotation of said at least one of said parts from said grid signal.

Claim 1 recites a method to control placement of a first part on a second part. The method includes reading a grid signal contained in a digital watermark, and determining angular rotation of at least one of two parts from the grid signal.

The Wang patent does not recite such a grid signal. Nor does the Wang patent contemplate controlling placement of a first part on a second part.

(As discussed above with respect to claim 21, the cited passages from the Wang patent seem concerned with carrying data (e.g., binary data) encoded in a 2-D graphic such as a 2-D barcode. A decoding operation decodes a 2-D graphic and generates output signals to represent the data (Col. 2, lines 53-55). The data may include, e.g., a phone number or data entry instructions (Col. 6, lines 43-47). The invention seems directed at a system to represent data in machine-readable form to expand applications for automatic data entry (Col. 3, lines 27-31).)

The cited passages from the Rhoads patent are not understood to discuss placement of a first part on a second part with reference to angular rotation of a grid signal carried by one of the parts.

The Schaffer patent is cited as teaching a vision alignment system, but Schaffer is not understood to teach or suggest an inconspicuous digital watermark including a grid signal. Schaffer would instead use a visible hash mark (see Fig. 10). The Schaffer patent is also not

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understood to teach to suggest modifying its embodiments to handle invisible codes or components.

The proposed combination fails to teach or suggest the combination recited in claim 1.

We also question the motivation statement on page 10, lines 10-12, of the July 1, 2005, Final Office Action. The Examiner suggests that that one of ordinary skill in the art would be motivated to combine the teaching in the Rhoads patent with the teachings in the Wang patent "to allow for an increase in the amount of data encoded onto the label".

But we do not think that increasing data capacity of a label is an important motivator here. Rather, a digital must include a grid signal as recited in claim 1.

We respectfully request that the final rejection of claim 1 be reversed.

#### Claims 17-20

*Independent claim 17 reads as follows:*

17. A method for controlling placement of a first part on a second part, wherein the first part includes steganographic encoding redundantly provided thereon, the steganographic encoding including an orientation component, said method comprising:

receiving image data corresponding to at least a portion of the first part, the portion including at least one redundant instance of the steganographic encoding;

reading the orientation component of the steganographic encoding;

determining an orientation of the first part through reference to at least the orientation component of the steganographic encoding;

controlling placement of the first part on the second part through reference to at least the determined orientation of the first part.

The Wang patent fails to teach or suggest a method to control placement of a first part on a second part or that the first part includes steganographic encoding redundantly provided thereon, with the steganographic encoding including an orientation component. The Office seems to agree (see the July 1, 2005, Final Office Action at page 11, lines 10-13).

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The Wang patent also fails to teach or suggest determining an orientation of the first part through reference to at least the orientation component of the steganographic encoding. Again, the Office seems to agree (see the July 1, 2005, Final Office Action at page 11, lines 10-13).

The cited passages from the Rhoads patent are not understood to discuss placement of a first part on a second part through reference to at least the orientation component of the steganographic encoding. Instead, the cited Col. 95 passage deals with object security, e.g., thwarting piracy.

The Schaffer patent is cited as teaching a vision alignment system, but Schaffer is not understood to teach or suggest steganographic encoding including an orientation component. There is no hint or suggestion in any of the documents to make necessary modifications to the Schaffer patent to handle invisible codes or steganographic orientation components for placement of a first part on a second part – especially since the cited passages from the primary reference (the Wang patent) and the secondary reference (the Rhoads patent) do not even discuss placement of a first part on a second part.

Again, we find the stated motivation lacking (see the July 1, 2005, Final Office Action at page 13, lines 6-10). Instead of increasing the data carrying capacity of a label, there should be some contemplation in the Wang patent or the Rhoads patent for placement of parts on one another.

We respectfully request that the final rejection of claim 17 be reversed.

Claims 6-11

*Independent claim 6 reads as follows:*

6. A system for controlling a pick and placement machine which places a first part on a second part and wherein at least one of said parts includes a digital watermark, said system comprising:

means for reading data from said digital watermark from said part, and

means for determining the orientation of said at least one of said parts from the data read from said digital watermark.

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We respectfully refer the Board to our position regarding at least claim 1 above. As a review, the Wang patent and the Rhoads patent do not discuss pick and placement machines. And, while the Schaffer patent does discuss pick and placement machines, there is no teaching or suggestion in these references to modify the systems mentioned in the Schaffer patent to accommodate the Examiner's proposed rejection.

We respectfully request that the final rejection of these claims be reversed as well.

#### **CONCLUSION AND REQUEST FOR REVERSAL**

The applied patents fail to disclose all of the limitations of the pending claims. (Other deficiencies of these patents need not be further belabored at this time.) And we respectfully disagree with the Examiner's suggested motivation to combine the patents.

The claims are believed patentable over the applied patents.

Appellant respectfully requests that the Board reverse the final rejection of the pending claims.

Date: January 3, 2006

Respectfully submitted,

Customer No. 23735

DIGIMARC CORPORATION

Telephone: 503-469-4685  
FAX: 503-469-4777

By St SL  
Steven W. Stewart  
Registration No. 45,133

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**CLAIMS APPENDIX**

1. (previously presented): A method for controlling placement of a first part on a second part comprising,

placing a printed image containing a digital watermark on at least one of said parts,  
capturing a digital image of said printed image,  
reading a grid signal contained in said digital watermark, and  
determining the angular rotation of said at least one of said parts from said grid signal.

2. (previously presented): The method of claim 1 including reading other payload data from said digital watermark.

3. (previously presented): The method of claim 1 wherein said grid signal is used to determine a location of at least one of said parts.

4. (original): The method recited in claim 1 wherein said first part is an electronic component.

5. (original): The method recited in claim 1 wherein said second part is a printed circuit board.

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6. (previously presented): A system for controlling a pick and placement machine which places a first part on a second part and wherein at least one of said parts includes a digital watermark, said system comprising:

means for reading data from said digital watermark from said part, and

means for determining the orientation of said at least one of said parts from the data read from said digital watermark.

7. (previously presented): The system of claim 6 including means for reading payload data from said watermark.

8. (previously presented): The system of claim 6 wherein the orientation is used to determine a location of said at least one of said parts.

9. (previously presented): The system of claim 6 wherein the orientation is used to determine a distance of said at least one of said parts from said means for reading.

10. (original): The system of claim 6 wherein said first part is an electronic component.

11. (original): The system of claim 6 wherein said second part is a printed circuit board.

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12. (previously presented): A robot for handling items, said robot including, a camera for acquiring an electronic image of a digital watermark, a computer including a program for reading a digital watermark in an electronic image acquired by said camera, a controller for controlling said robot in response to orientation data acquired from said digital watermark, said controller controlling positioning or movement of an item including the digital watermark.

13. (original): The robot recited in claim 12 including means for reading a grid signal from said digital watermark.

14. (original): The robot recited in claim 13 wherein said printed image is on an item to be handled by said robot.

15. (previously presented): The robot recited in claim 14 including means for determining a distance from said camera to the printed image from said grid signal.

16. (previously presented): The robot recited in claim 14 including means for determining a orientation of the printed image from said grid signal.

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17. (previously presented): A method for controlling placement of a first part on a second part, wherein the first part includes steganographic encoding redundantly provided thereon, the steganographic encoding including an orientation component, said method comprising:

receiving image data corresponding to at least a portion of the first part, the portion including at least one redundant instance of the steganographic encoding;

reading the orientation component of the steganographic encoding;

determining an orientation of the first part through reference to at least the orientation component of the steganographic encoding;

controlling placement of the first part on the second part through reference to at least the determined orientation of the first part.

18. (previously presented): The method of claim 17, wherein the determined orientation of the first part comprises an angular rotation of the first part.

19. (previously presented): The method of claim 17, wherein the determined orientation of the first part comprises an relative distance of the first part.

20. (previously presented): The method of claim 17, wherein the steganographic encoding further comprises an identifier to identify the first part.

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21. (previously presented): A robot for handling items, said robot comprising:

an image sensor for sensing image data of an item including a machine-readable code provided on a surface thereof, wherein the machine-readable code comprises an orientation component;

electronic processing circuitry; and

memory including instructions stored therein for execution by the electronic processing circuitry, the instructions including instructions to:

analyze image data captured by the image sensor,

determine from analyzed image data an orientation of the item relative to the orientation component, and

provide position information based on a determined orientation of the item.

22. (previously presented): The robot of claim 21, wherein the item includes redundant instances of the machine-readable code provided on the surface.

23. (previously presented): The robot of claim 21, wherein the position information comprises at least one of an angular rotation and relative distance.

24. (previously presented): The robot of claim 21 wherein the machine-readable code comprises steganographic encoding.

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25. (previously presented): The robot of claim 21 wherein the machine-readable code comprises digital watermarking.

26. (previously presented): The method of claim 17 wherein the steganographic encoding comprises digital watermarking.

27. (previously presented): The method of claim 17 wherein the first part comprises an electronic component.

28. (previously presented): The robot of claim 21 wherein the robot handles items in a pick-and-place system, and wherein at least one of the items comprises an electronic component.

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**EVIDENCE APPENDIX**

**(No Evidence)**

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**RELATED PROCEEDINGS APPENDIX**

**(No Related Proceedings)**